

# The Side-Splitter

## Section 7-5

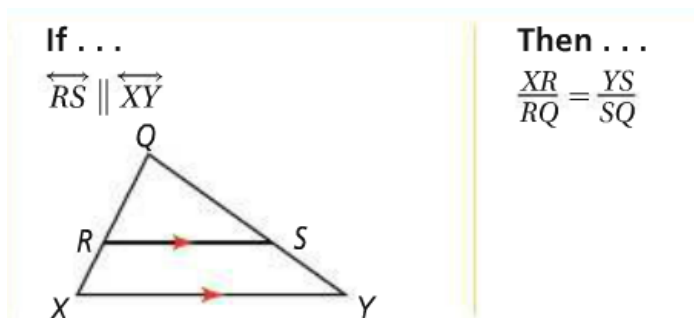
### Learning objective

- Use proportions to determine the value of triangle segments formed by "side-splitter" segments.

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## What is the "side-splitter"?

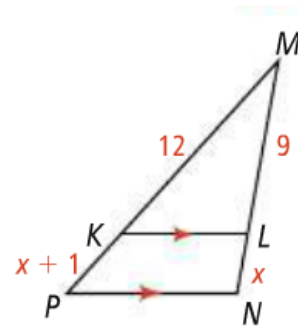
Theorem 7-4 states that a line segment connecting two sides of a triangle and parallel to the third side splits the lines proportionally.



Q: does this remind you of a line segment we've studied before?

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## Example

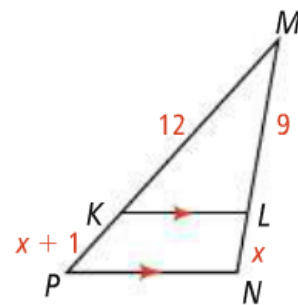
What is the value of  $x$ ?

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## Example

What is the value of  $x$ ?

$$\begin{aligned} \frac{PK}{KM} &= \frac{NL}{LM} && \text{Side-Splitter Theorem} \\ \frac{x+1}{12} &= \frac{x}{9} && \text{Substitute.} \\ 9x + 9 &= 12x && \text{Cross Products Property} \\ 9 &= 3x && \text{Subtract } 9x \text{ from each side.} \\ 3 &= x && \text{Divide each side by 3.} \end{aligned}$$

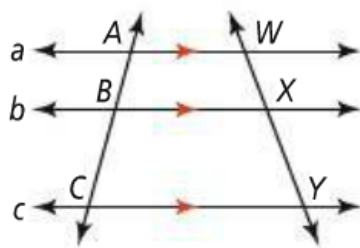


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### Corollary to the side-splitter

If ...

$$a \parallel b \parallel c$$



Then ...

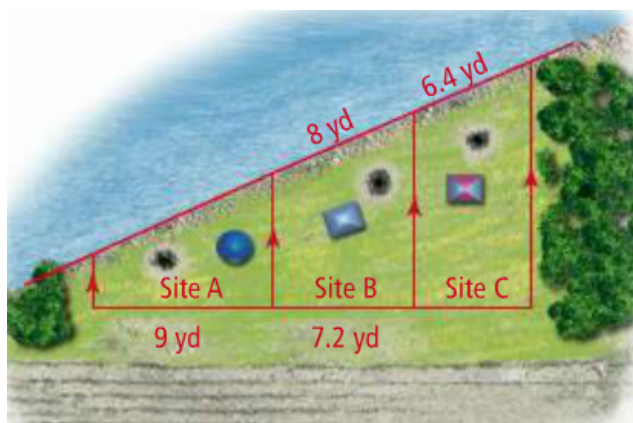
$$\frac{AB}{BC} = \frac{WX}{XY}$$

If three (or more) parallel lines intersect two transversals then the line segments formed by those transversals are proportional.

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### Example

How long is the waterfront for camping site A?



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## Example

How long is the waterfront for camping site A?

Let  $x$  be the length of Site A along the river.

$$\frac{x}{8} = \frac{9}{7.2} \quad \text{Corollary to the Side-Splitter Theorem}$$

$$7.2x = 72 \quad \text{Cross Products Property}$$

$$x = 10 \quad \text{Divide each side by 7.2.}$$

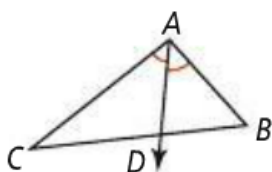
The length of Site A along the river is 10 yd.



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## Theorem 7-5

If ...  
 $\overrightarrow{AD}$  bisects  $\angle CAB$



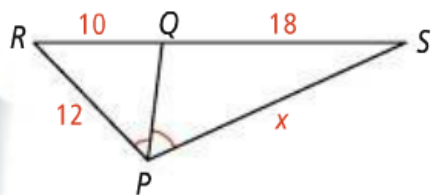
Then ...

$$\frac{CD}{DB} = \frac{CA}{BA}$$

Theorem 7-5 states that a ray that bisects an angle of a triangle divides the opposite side into two segments that are proportional to the sides opposite them.

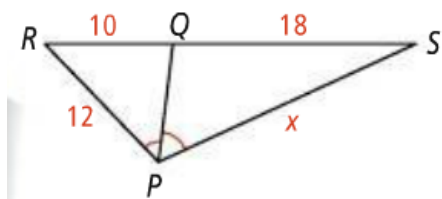
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Example

What is the value of  $x$ ?

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Example

What is the value of  $x$ ?

$$\frac{RQ}{QS} = \frac{PR}{PS}$$

$$\frac{10}{18} = \frac{12}{x}$$

$$10x = 216$$

$$x = 21.6$$

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